

Skills Worksheet

Directed Reading

Section: Chromosomes

In the space provided, explain how the terms in each pair differ in meaning.

1. cell division, gamete

2. gene, DNA

3. chromosomes, chromatids

Study the following steps of binary fission in a bacterium. Determine the order in which the steps take place. Write the number of each step in the space provided.

- _____ 4. New cell wall forms around the new membrane.
- _____ 5. New cell membrane is added to a point on the membrane between the two DNA copies.
- _____ 6. The bacterium is pinched into two independent cells.
- _____ 7. The growing cell membrane pushes inward, and the cell is constricted in two.
- _____ 8. DNA is copied.

Directed Reading *continued*

Complete each statement by writing the correct term or phrase in the space provided.

9. Chromosomes that are similar in size, shape, and genetic content are called _____ .
10. A cell, such as a somatic cell, that contains two sets of chromosomes is said to be _____ .
11. Biologists use the symbol _____ to represent one set of chromosomes.
12. A fertilized egg cell, the first cell of a new individual, is called a(n) _____ .

Read each question, and write your answer in the space provided.

13. What is the difference between an autosome and a sex chromosome?
- _____
- _____
- _____
14. What is a karyotype?
- _____
- _____
- _____
15. Describe four types of mutations resulting from the breakage of chromosomes.
- _____
- _____
- _____
- _____

Skills Worksheet

Directed Reading

Section: The Cell Cycle

Complete each statement by writing the correct term or phrase in the space provided.

1. The cell cycle is a repeating sequence of growth and _____ during the life of a cell.
2. The first three phases of the cell cycle are collectively called _____.

In the space provided, write the letter of the description that best matches the term or phrase.

- | | |
|--|--|
| _____ 3. first growth (G_1) phase | a. nucleus divides into two nuclei |
| _____ 4. synthesis (S) phase | b. cytoplasm divides |
| _____ 5. second growth (G_2) phase | c. preparations are made for the nucleus to divide |
| _____ 6. mitosis | d. DNA is copied |
| _____ 7. cytokinesis | e. cell carries out its routine functions |

Complete each statement by writing the correct term or phrase in the space provided.

8. Many _____ control the cell cycle.
9. The checkpoint that makes the key decision of whether the cell will divide is the _____ checkpoint.
10. The information necessary to make the proteins that regulate cell growth and division is contained in _____.

Read the question, and write your answer in the space provided.

11. Describe the role of checkpoints in the onset of cancer.

Skills Worksheet

Directed Reading

Section: Mitosis and Cytokinesis

Read each question, and write your answer in the space provided.

1. What function do spindles perform during mitosis?

2. What function do centrioles perform in animal cell mitosis?

In the space provided, write the letter of the description that best matches the term or phrase.

_____ **3.** prophase

a. Chromosomes move to the center of the cell and line up along the equator.

_____ **4.** telophase

b. A nuclear envelope forms around the chromatids at each pole.

_____ **5.** metaphase

c. Chromosomes coil up and become visible.

_____ **6.** anaphase

d. The two chromatids move toward opposite poles as the spindle fibers attached to them shorten.

Study the following steps of mitosis. Determine the order in which the steps take place. Write the number of each step in the space provided.

_____ **7.** prophase

_____ **8.** telophase

_____ **9.** metaphase

_____ **10.** anaphase

Complete each statement by underlining the correct term or phrase in the brackets.

11. Cytokinesis begins [before / after] mitosis.

12. During cytokinesis in animal cells, the cell is pinched in half by [the cell wall / a belt of proteins].

Answer Key

Directed Reading

SECTION: CHROMOSOMES

1. Cell division is the process by which new cells form. Gametes are reproductive cells that form by one type of cell division.
2. A gene is a segment of DNA that codes for a protein or RNA molecule. DNA is a substance made of nucleotides that stores information about when and how to make proteins.
3. Chromosomes are structures made of DNA and associated proteins. Chromatids are the two parts of a chromosome that contain identical copies of DNA and are joined by a centromere.
4. 4
5. 2
6. 5
7. 3
8. 1
9. homologous
10. diploid
11. n
12. zygote
13. Autosomes are chromosomes that are not directly involved in determining the sex of an individual. Sex chromosomes, such as X and Y chromosomes, contain genes that determine the sex of an individual.
14. A karyotype is a photograph of the chromosomes in a dividing cell that shows the chromosomes arranged by size.
15. deletion—a piece of a chromosome breaks off; duplication—a chromosome fragment attaches to its homologous chromosome, which then has two copies of the genes in the fragment; inversion—a chromosome fragment attaches to the same chromosome in the reverse orientation; translocation—a chromosome fragment attaches to a nonhomologous chromosome

SECTION: THE CELL CYCLE

1. division
2. interphase
3. e
4. d
5. c
6. a
7. b
8. proteins
9. cell growth
10. genes
11. Mutations in genes that produce checkpoint proteins may cause the proteins to malfunction and prevent the checkpoints from controlling cell division. Uncontrolled cell division may result in cancer.

SECTION: MITOSIS AND CYTOKINESIS

1. They move chromosomes during mitosis.
2. They help form the spindle.
3. c
4. b
5. a
6. d
7. 1
8. 4
9. 2
10. 3
11. after
12. a belt of proteins

Active Reading

SECTION: CHROMOSOMES

1. A gene is a segment of DNA that codes for a protein or RNA molecule.
2. The strand is stretched out so that the information it contains can be decoded and used to direct the synthesis of proteins needed by the cell.
3. Chromatids are exact copies of DNA that make up chromosomes.
4. b